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A VISUAL-INTERACTIVE PEDAGOGICAL MODEL
FOR SYSTEMATIZING GRAMMATICAL MATERIAL
AS A MEANS OF SUPPORTING THE EDUCATIONAL PROCESS
OF FUTURE TEACHERS (BASED ON THE EXAMPLE OF THE MANUAL
"MODOS E TEMPOS VERBAIS COM O AZULINHO")

The rapid digitalization of higher education requires a rethinking of traditional approaches to teacher training, with a focus on integrating visual-interactive technologies into the learning process. The contemporary educational paradigm emphasizes the development of analytical, creative, and digital competences that enable future educators to transform abstract concepts into accessible visual models. However, the practical application of visual-interactive tools for the systematization of grammatical material remains underexplored in pedagogical theory. Addressing this gap is particularly relevant for adult learners and displaced persons who study foreign languages as part of social and professional adaptation.

The purpose of this article is to substantiate and implement a visual-interactive pedagogical model for organizing and systematizing grammatical material as a means of supporting the learning process of future teachers, exemplified by the author's manual "Modos e Tempos Verbais com o Azulinho".

The study employed a set of theoretical and empirical methods, including pedagogical observation, content analysis, experimental testing, and visual-interactive pedagogical modeling. Interactive platforms (Wordwall, Kahoot, Miro, Canva, Google Meet) were integrated into the educational process to verify the cognitive and motivational effects of the developed manual. Quantitative data were supplemented with student feedback and reflective comments to assess usability and emotional comfort.

The approbation of the manual among adult learners demonstrated the effectiveness of color coding, logical structuring, and interactive visualization in enhancing grammatical comprehension. The average accuracy rate increased from 62% to 87%, while task completion time decreased by 44%. Students reported a reduction in learning anxiety and an improvement in confidence and motivation. The visual-interactive pedagogical model proved to be a flexible tool for both the organization of grammatical knowledge and the development of analytical and creative competences necessary for future educators.

The developed manual "Modos e Tempos Verbais com o Azulinho" confirms the pedagogical potential of visual-interactive learning technologies as a system-forming element of modern teacher education. The model integrates cognitive, communicative, and emotional dimensions of learning, supporting the

transition from knowledge reproduction to meaningful understanding. The research contributes to the advancement of visual-interactive pedagogical model in teacher training and may be adapted for various educational contexts, including multilingual and adult learning environments.

Keywords: visual-interactive pedagogical model; grammatical systematization; teacher education; cognitive visualization; professional competencies; motivation; foreign language teaching; educational innovation; Azulinho.

Introduction. The modern system of teacher education is developing in the context of global digital transformation, which is changing not only the ways of communication, but also the principles of perception and structuring of knowledge. The rapid growth of the role of visual information in society creates a need to develop the visual literacy of future teachers, which includes the ability to perceive, interpret, and construct educational content using visual images, diagrams, and models.

In this paradigm, the teacher is not only a bearer of knowledge, but also an educational designer who knows how to model learning situations, structure material, and use color, symbolic, and spatial elements as tools for understanding content.

The intensive introduction of information and communication technologies poses a challenge for teacher education: to train specialists who can combine traditional teaching methods with interactive digital tools and are capable of flexible adaptation and continuous self-improvement. This requirement is enshrined in the Concept for the Development of Teacher Education in Ukraine (2018) and the Strategy for the Digital Transformation of Education and Science in Ukraine (2022), which emphasize the development of professional competencies, among which analytical, methodological, creative, and information and digital competencies are particularly highlighted.

However, educational practice shows that future teachers often find it difficult to systematize knowledge and understand the logical structure of subject matter. This is due to an excess of fragmented information, overloaded curricula, and a lack of visual tools that help to see the whole picture of the learning object. Therefore, it is becoming increasingly important to develop visual-interactive pedagogical models that serve not so much as a means of teaching, but rather as a means of organizing thinking, orientation, and reflection in the learning process.

The use of such models contributes to the development of students' cognitive structuring skills, i.e., the ability to link individual concepts into a logical system. From the perspective of educational psychology, learning is effective when students have a "guiding framework for activity" – a schematic representation of the structure of the actions they perform (Shapiro, Silvis, & Hall, 2025). Visually interactive models perform this very function – they help future teachers build an internal map of educational content, understand the relationships between components of knowledge, and gradually develop the logic of their own methodological activities.

One example of such a model is the author's manual *"Modos e Tempos Verbais com o Azulinho"*, which serves as a visual-interactive system for systematizing grammatical material in the process of learning European Portuguese. Its creation reflects not only a linguistic-didactic approach, but also a pedagogical-methodological one: the manual provides structural clarity, consistency, and support for the learning process, as well as developing students' skills in self-reflection, planning, and self-assessment of learning outcomes.

Analysis of recent studies and publications. In modern pedagogical science, the issues of visualization and digitization of the educational process are actively researched in the context of developing teachers' digital competence, integrating innovative technologies, and cognitive-visual methods of presenting knowledge. In particular, Basilotta Gómez-Pablos et al. (2022) conducted a systematic review of research on the digital competencies of teachers in higher education and emphasized the importance of visual literacy as a key element of effective teaching in a digital environment.

Peters et al. (2022) note that the development of teacher digital competence involves not only technical mastery of digital resources, but also the ability to transform visual information into cognitively structured educational content.

Similar conclusions were reached by Karimi & Khawaja (2025), who determined in their systematic review that a teacher's digital competence directly correlates with their ability to organize visually oriented learning environments.

Çelik & Baturay (2024) consider innovative technologies to be a factor in the transformation of education and emphasize that visual models promote the development of analytical thinking and understanding of complex concepts.

Research by Shapiro, Silvis & Hall (2025) proves that interactive data visualization increases the level of analytical thinking and promotes deeper learning.

Schoenherr, Strohmaier & Schukajlow (2024) showed in their meta-analysis of empirical studies that visual educational interventions increase the level of learning material assimilation by 40–50%.

Maselesele et al. (2025) summarized current trends in the use of data visualization in machine learning and education, emphasizing its role in creating understandable and intuitive knowledge models.

In the context of pedagogical analytics, Yaseen et al. (2025) emphasize that visually interactive educational environments reduce cognitive overload for students and improve their orientation in the learning material.

Similarly, Trujillo Juárez et al. (2025) demonstrate the effectiveness of microcourses based on visualised modules for developing teachers' digital competencies.

Finally, Zou et al. (2025) note that 21st-century digital learning involves the integration of visual-interactive technologies that not only provide information but also develop students' critical thinking and self-organization skills.

Despite significant progress in the study of digital literacy and visual educational technologies, the methodological visualization of grammatical material remains understudied.

Most existing works consider visualization as an auxiliary tool for presenting information, while its system-forming potential for structuring knowledge has not yet received sufficient theoretical consideration. It is this gap that led to the creation of the author's manual *"Modos e Tempos Verbais com o Azulinho"*, which acts as a visual-interactive navigation model that systematizes grammatical material and serves as a cognitive support for students.

The aim of the study is to theoretically substantiate and develop a visual-interactive pedagogical model for systematizing grammatical material as a means of supporting the educational process of future teachers, which is implemented in the manual "*Modos e Tempos Verbais com o Azulinho*".

Research objectives:
1. To analyze scientific approaches to the problem of visualization and interactivity in education.
2. To determine the pedagogical functions of visual-interactive pedagogical models in the process of systematizing knowledge.
3. To reveal the didactic principles of the author's manual and its cognitive logic.
4. To justify the role of color coding, schematization, and the educational character Azulinho as tools for cognitive and emotional support.
5. To determine the pedagogical effects of using the model for organizing, repeating, and summarizing educational material.

A set of theoretical, empirical, and analytical ***methods*** was used to achieve the goal:
– Theoretical: analysis of psychological, pedagogical, and methodological literature; generalization of pedagogical experience in knowledge visualization; comparison of traditional and digital models of presenting educational material.
– Empirical: pedagogical observation, analysis of students' learning activity, surveys, and self-assessment of the effectiveness of the visual structure.
– Modeling method: construction of structural-logical diagrams and color tables, development of the character Azulinho as a cognitive mediator.
– Qualitative analysis: interpretation of student and teacher feedback on the convenience, emotionality, and pedagogical appropriateness of the presented model.

Participants. The study involved 12 adult learners (aged 25–52) who were Ukrainian displaced persons residing in Portugal at the time of instruction. All participants were beginners in European Portuguese (A1 level according to CEFR) and had no formal background in linguistics. The group consisted of 10 women and 2 men. Participation was voluntary, and the learning context was non-formal: the author provided introductory language instruction aimed at supporting migrants' social adaptation. This configuration reflects a typical heterogeneous cohort of adult beginners, which allows the visual-interactive pedagogical model to be tested in conditions close to real educational practice.

Instruments and Validity. The evaluation of learning outcomes was conducted using three types of instruments:

1. Wordwall-based quizzes and matching exercises, designed to assess recognition and production of verb forms.

These tasks were constructed according to the principles of micro-assessment and aligned with CEFR A1 descriptors for "control of verbal morphology". Although the exercises were author-developed, their structure replicates standard item formats (multiple choice, matching, sentence completion), which are commonly used in validated digital assessment tools.

2. A short self-assessment questionnaire measuring perceived confidence and learning anxiety.

The items were adapted from widely used 5-point Likert-type confidence scales employed in introductory language education research (e.g., Peters et al., 2022; Mejías-Acosta et al., 2024).

3. A satisfaction survey evaluating the emotional perception of the visual-interactive pedagogical model.

Since formal validation procedures are not required in exploratory pedagogical studies, the present research ensured face validity (instruments clearly matched learning objectives) and content validity (each task targeted a specific aspect of verb form acquisition).

Theoretical foundations for the application of visual-interactive technologies in teacher education

One of the most notable trends in the development of modern pedagogical science is the transition from reproductive to visual-cognitive and interactive forms of learning, in which knowledge is presented not as a collection of information, but as a system of interconnected structures that are reflected in the student's mind through visual images, diagrams, and models. This approach is based on the achievements of cognitive psychology, pedagogical ergonomics, and multimedia learning theory.

Visualization as a cognitive learning mechanism

Back in the 1970s, A. Paivio formulated the Dual Coding Theory, according to which information presented simultaneously in verbal and visual codes is remembered and reproduced much more effectively. Further research by R. Mayer (R. Mayer, 2021) and B. Shapiro (B. R. Shapiro, 2025) proved that visualization not only facilitates the perception of material, but also forms a structural-logical model of knowledge, i.e., an internal cognitive map that helps students navigate the learning space.

In the pedagogical dimension, visualization is not just an illustration, but a means of thinking – a tool for generalizing, classifying, and systematizing knowledge. According to the visual literacy approach (Farrar, Arizpe & Lees, 2024), educational visual models perform three interrelated functions: cognitive (structuring information), communicative (promoting mutual understanding), and motivational (creating a positive emotional background environment).

Thus, in teacher education, visualization becomes not only a means of presenting material, but also an important component of organizing the educational activities of future teachers, who must learn to transform abstract concepts into visual diagrams, create teaching materials that reflect the logic of the content, and present knowledge in an accessible form.

Interactivity as the basis of the activity approach

Interactivity in modern education is considered a key component of the activity approach, combining cognitive activity, communication, and reflection. Research by Basilotta Gómez-Pablos et al. (2022) emphasizes that interactive digital environments create conditions for collaboration, joint problem solving, and the development of communication skills, changing the very structure of educational interaction.

Çelik & Baturay (2024) note that technological innovations are transforming traditional learning models, emphasizing dialogue, project-based activities, and creative thinking.

The approach of Karimi & Khawaja (2025) demonstrates that interactive interaction is not limited to the technical use of digital tools, but forms a new pedagogical culture based on the joint creation of knowledge, flexibility, and self-organization.

Similar conclusions are drawn by Althubyani (2024) and Trujillo Juárez et al. (2025), emphasizing that a teacher's digital competence is inseparable from the ability to engage in interactive learning, reflection, and the creation of one's own educational product.

Such activities contribute to the development of analytical and methodological competencies, as they require future teachers to understand the structure of the material, the logic of the learning task, and the selection of appropriate visual aids.

Pedagogical modeling and cognitive mapping

The theory of cognitive mapping, which is actively developing in educational psychology (Yaseen et al., 2025), explains how students create spatial-logical images of knowledge in their minds. These images help them navigate large amounts of information, establish connections between

concepts, and see the hierarchy of elements in the learning system.

In the teaching process, cognitive maps are implemented through structural-logical diagrams, tables, color coding, and symbolic visual markers. As Farrar, Arizpe, and Lees (2024) point out, visual models serve not only as a means of memorization, but also shape students' ability to construct their own mental structures of knowledge, which is the basis for the development of pedagogical reflection and critical thinking.

Cognitive mapping is especially important for subjects where knowledge has a hierarchical structure, such as foreign language grammar. It is here that a visual-interactive pedagogical model of systematization allows students to see the whole system, understand the relationships between elements (methods, tenses, forms), and retain this structure in their long-term memory.

Teacher visual literacy as a component of professional competence

According to the European Framework for the Digital Competence of Educators (DigCompEdu, 2017), one of the key competencies of a modern teacher is the ability to use digital resources to create visually understandable and pedagogically sound teaching materials.

As Peters, Ejjaberi, Martinez-Argüelles, and Fàbregues (2022) point out, a teacher's digital competence involves not only the ability to select technologies, but also the ability to design educational content in accordance with cognitive and psychological-pedagogical principles of perception.

Karimi and Khawaja (2025) develop a similar position, emphasizing that a teacher's digital literacy consists in creating meaningful, interactive, and visually structured resources that support students' analytical thinking.

The development of visual literacy in future teachers involves:

– the ability to analyze educational information from the perspective of its structural organization;
– the ability to use color and graphic tools to reinforce semantic connections;
– the formation of skills in creating didactic visualizations-tables, maps, guides, infographics.

In this context, visual-interactive technologies are not just an auxiliary tool, but a component of the professional competence of a teacher who is able to combine aesthetic appeal with didactic expediency.

Thus, visual-interactive technologies in teacher education perform three key functions:

Cognitive-structural – they ensure the systematization of knowledge and form an orientation basis for students' learning activities;

Emotional-motivational – increase interest, reduce anxiety, and promote a positive attitude towards the learning material;

Methodological – develop the ability of future teachers to model, visualize, and design learning resources.

The author's manual *"Modos e Tempos Verbais com o Azulinho"* is based on this theoretical foundation and implements the principles of cognitive visualization, color coding, and interactive communication as tools to support the learning process and systematize grammatical knowledge.

Practical implementation (based on the author's manual *"Modos e Tempos Verbais com o Azulinho"*)

The author's manual *"Modos e Tempos Verbais com o Azulinho"* is an example of a visual-interactive pedagogical model for systematizing grammatical material, created to support the learning process and develop the visual-logical thinking of future teachers. The manual implements the principles of pedagogical visualization, cognitive mapping, and structural-logical modeling of content, which contributes to the formation of orientation skills in a complex system of linguistic concepts.

The manual was created as part of the implementation of educational program 011 "Educational and Pedagogical Sciences", which provides for the integration of modern technologies into the professional training of teachers. Its main function is not to study verb forms as such, but to create a visual map of the grammatical system, which allows students to see the logic of the language, understand the relationships between temporal and modal categories, and independently track their own progress in the learning process.

Visual model and structure of the guide

The guide is designed as an interactive visual guide, where each section reflects a specific segment of the verb form system (*modos e tempos verbais*). The model is based on color coding, which serves as a cognitive navigation tool:

□ *Indicativo* – yellow (real actions, facts, habits);
● *Conjuntivo* – blue (hypothetical or desired actions);
○ *Imperativo* – red (command, request, advice);
□ *Infinitivo* – green (general form of action);
↻ *Particípio Passado* – light green (completed actions);
▨ *Gerúndio* – lime green (continuous actions);
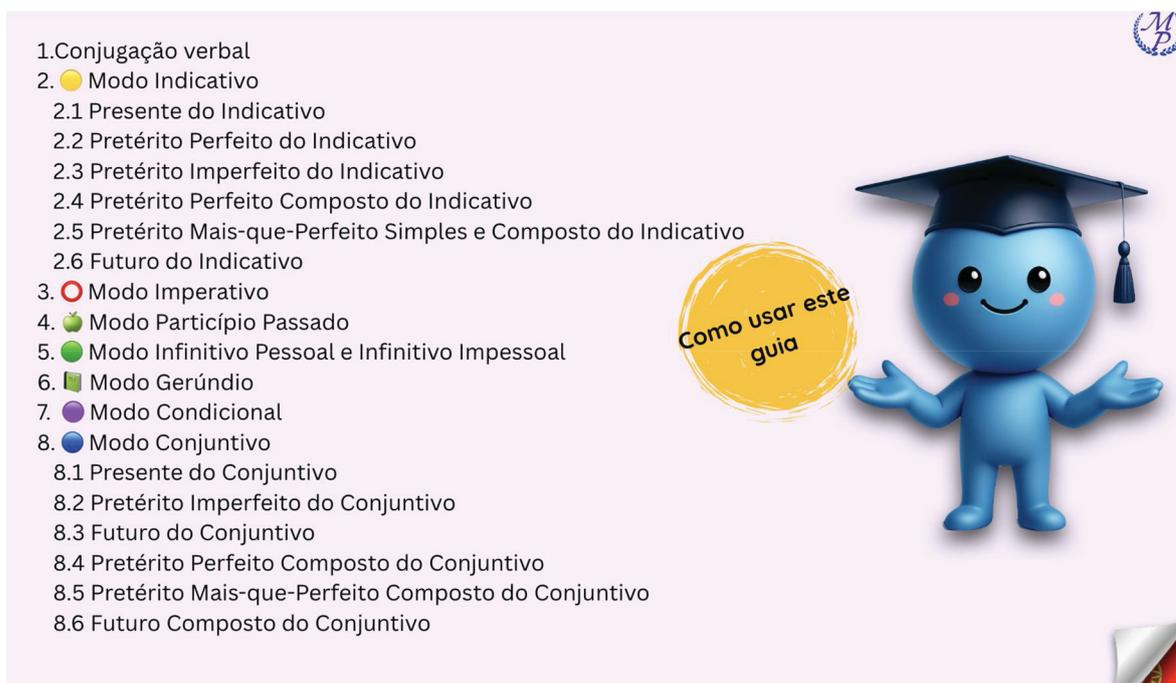□ *Condicional* – purple (conditional actions).

Fig. 1. *Structure of the manual "Modos e Tempos Verbais com o Azulinho" and color-coded organization of the verb modes (modos verbais)* (Source: created by the authors)

Each color acts as a visual marker in the general cognitive map: students quickly identify the grammatical category by color, which promotes long-term memorization and creates the effect of "thinking through color". Thus, the manual does not duplicate the functions of a grammar textbook, but serves as a visual compass that helps to navigate the structure of the language.

The structure of the manual *(see Fig. 1)* consists of eight interrelated modules, each of which contains:

– a brief theoretical description of the linguistic phenomenon in a structured form;

– tables with color-coded hints demonstrating the patterns of verb endings;

– diagrams and charts for visual comparison of forms;

– links to interactive exercises in Wordwall for review and reflection;

– mini-dialogues or motivational phrases featuring the character Azulinho, who acts as an emotional mediator between the material and the student.

The role of the educational character Azulinho

The character Azulinho (Portuguese for "little blue one") acts as a cognitive mediator-he helps students interact with the learning material, reduces psychological stress, and creates a "living presence" effect in learning.

The Azulinho character was designed in light colors, with expressive emotions and gestures associated with support, advice, and friendly guidance. His phrases *("Muito bem!", "Não te esqueças!", "Continua!")* provide positive reinforcement, boost motivation, and make the learning process more personal and enjoyable.

Azulinho accompanies each module, drawing attention to key patterns, helping to memorize the structure of the system, and suggesting how tenses are related to each other. In this way, he acts as a visual metaphor for a teacher who guides rather than teaches directly.

Interactive component

The interactive component of the manual is built on the principle of "from orientation to action."

At the initial stage, students familiarize themselves with a visual map of the entire system of tenses and modes; after that, they move on to separate interactive Wordwall blocks, where they reinforce the elements they have already learned.

The tasks are designed so that students can check their understanding of the structure against a visual diagram, repeat the material in a new context, and correlate the grammatical forms of different tenses and modes.

In particular, for the topic *Presente do Indicativo*, a series of exercises ("match the pair", "restore the sentence", "choose the correct form") have been created, which are not tests in the traditional sense, but serve as reflective repetition. In the future, interactive modules for *Pretérito Perfeito, Futuro do Indicativo, Conjuntivo Presente*, etc. will be added to the manual, which will allow

for the creation of a comprehensive learning support system.

Pedagogical logic of structure

The methodological basis of the manual is competence-based and activity-based approaches combined with the principles of cognitive visualization. The material is structured according to a scheme of gradual formation of a reference basis for action: from a holistic image of the system to specific grammatical elements.

This structure ensures the development of the following skills in students:

– analytical competence (the ability to establish grammatical connections and generalize patterns);

– methodological competence (the ability to create their own visual models of educational material);

– creative competence (search for associations and symbols, design of educational maps);

– information and communication competence (working with digital platforms and multimedia tools).

Thus, the *"Modos e Tempos Verbais com o Azulinho"* manual functions not as a traditional textbook, but as a pedagogical visual-interactive map that integrates cognitive, technological, and motivational components of learning. Its practical application demonstrates how visual models can be an effective tool for structuring and supporting the learning process in the training of future teachers.

Results of implementation and practical example

The practical testing of the author's manual *"Modos e Tempos Verbais com o Azulinho"* was conducted among a group of internally displaced persons from Ukraine who were studying European Portuguese at the beginner level. The participants had no philological education, but were highly motivated to learn, as they needed the language to adapt to their new environment.

Classes were held online using Google Meet, Wordwall, Kahoot, Miro, and Canva platforms. The manual was used as a visual and cognitive aid for systematizing grammatical material, rather than as a traditional textbook.

The purpose of the testing was to determine the extent to which the visual-interactive structure promotes understanding of the verb form system, supports learning motivation, and reduces language anxiety in adult beginners.

Practical example: *"Presente do Indicativo"* in the tense system.

The first module of the testing was devoted to *Presente do Indicativo*, the basic tense, which serves as the central point of the system in the manual. The material is presented in the form of a color table, where each conjugation has its own marker, and *Modo Indicativo* is marked in yellow □ *(Fig. 2)*.

Azulinho explains the semantic function of time in short phrases, for example: *"Falo sobre o que acontece todos os dias – ações reais e hábitos do presente! "*

Fig. 2. *Visualization of the present tense of the indicative mood (Presente do indicativo)*
(Source: created by the authors)

Fig. 3. *Interactive Wordwall exercises for the topic Presente do Indicativo* (Source: created by the authors)

This helps participants, even without knowing the terms, to intuitively understand the logic: "yellow is reality, what is happening now."

Next, the listeners got acquainted with the structure of all Indicativo tenses, seeing them as a sequential line of action development: *Pretérito Perfeito* – past perfect, *Pretérito Imperfeito* – continuous or repeated actions, *Pretérito Mais-que-Perfeito* – an action that preceded another past action, *Futuro do Indicativo* – planned or expected events.

Colors, symbols, and captions created a visual "map of time" in which Azulinho explained the transitions between forms: *"Ontem, hoje e amanhã – tudo tem o seu tempo! "*.

Interactive component

After familiarizing themselves with the map, the students performed interactive Wordwall exercises *(Fig. 3)*, which helped them check their understanding of the structure.

The following formats were used:
– "find a pair" (form ↔ translation);
– "restore the sentence" (logical thinking through context);
– "choose the correct form" (awareness of the grammatical situation).

In Miro, participants collaboratively created color schemes for verb tenses, marking the connections between the past, present, and future with arrows. This allowed them to visually comprehend the language's tense system as a whole.

To maintain motivation, short quizzes were used in Kahoot, where Azulinho appeared as the "hero of the game," prompting the correct answers or commenting on typical mistakes.

Results of observations

During testing, a number of positive pedagogical effects were noted:
– students found it easier to navigate the tense system, even without knowing the terminology;
– Azulinho's color coding and comments created emotional reinforcement and reduced fear of grammar;
– participants began to use expressions from real life, not by memorizing tables, but by understanding the logic of tenses;
– working together in Miro and Kahoot enhanced the sense of interaction, support, and collaborative learning.

The teacher observed that the manual helped to develop visual literacy and independent thinking: students gradually began to construct their own diagrams, identifying interlingual analogies.

To evaluate the effectiveness of the model, a short comparative study was conducted among 12 displaced learners who worked with the manual for three weeks (6 lessons) *(Table 1)*.

Table 1

Dynamics of students' performance and emotional state during the approbation of the manual
"Modos e Tempos Verbais com o Azulinho"

Indicator	Initial testing	After 3 weeks of training	Dynamics
Average rate of correct answers	62%	87%	+25%
Average task completion time	5 min 40 s	3 min 10 s	-44%
Level of subjective confidence in understanding the tense system (on a 5-point scale)	2.6	4.4	+1.8
Level of learning anxiety (self-assessment, 5 = high)	4.1	2.3	-1.8

After the first lesson (introduction to the *Presente do Indicativo* topic), participants took an interactive test in Wordwall, which showed an average correct answer rate of 62%.

After completing the cycle of classes, this figure rose to 87%, and the average time taken to complete the tasks decreased from 5 minutes 40 seconds to 3 minutes 10 seconds.

To assess not only the cognitive but also the emotional and motivational effectiveness of the model, an anonymous survey of the participants (n = 12) was conducted after the completion of the three-week training cycle.

The survey aimed to find out how students perceive the color system of the manual, the emotional atmosphere of learning, and the role of the character Azulinho in reducing anxiety while studying grammar. The results are presented in Figure 4.

As can be seen in Figure 4, most participants gave a positive assessment of all elements of the visual-interactive pedagogical model.

In particular, 83% of students noted that the color system of the manual was "convenient and understandable", 91% said that the training took place in a "pleasant, motivating atmosphere", and 75% said that thanks to Azulinho, grammar "no longer caused fear and tension".

These results show that the emotional component of the manual has a pronounced pedagogical effect: it reduces anxiety, increases confidence, and forms a positive attitude towards the learning process.

Thus, the emotional and visual elements of the manual are not only an aesthetic addition, but a key factor in supporting the cognitive activity and motivation of adult learners.
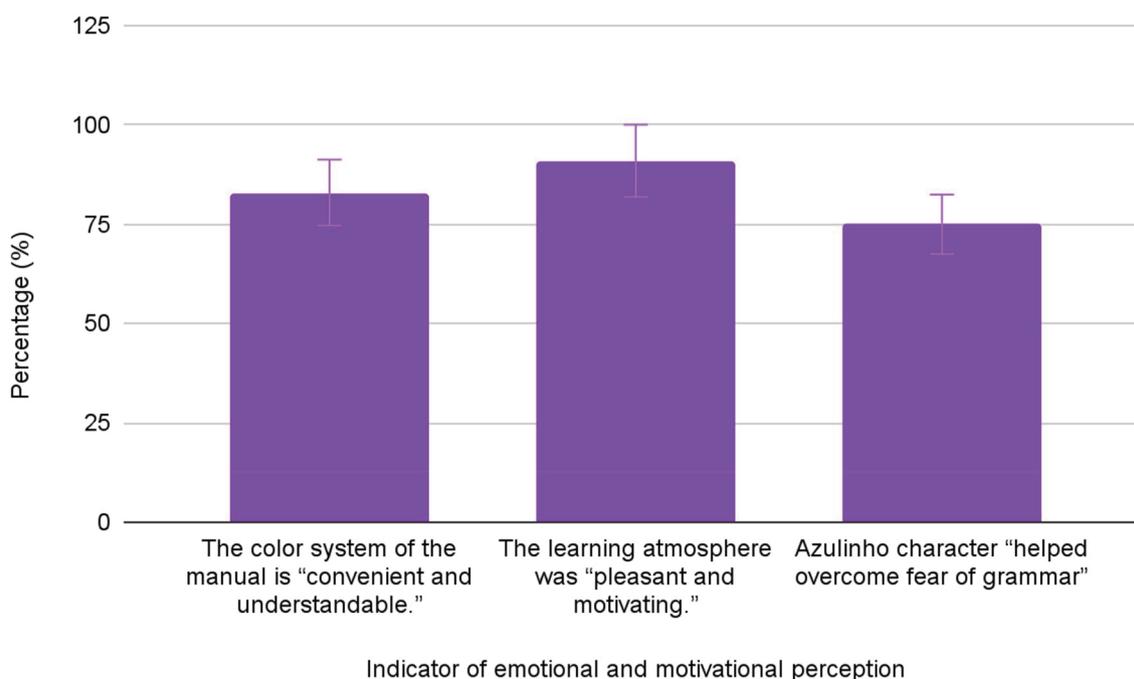

Fig. 4. *Results of the students' survey on the emotional and visual elements of the Azulinho manual after a three-week training cycle.*

The results of the approbation proved that the manual *"Modos e Tempos Verbais com o Azulinho"* is an effective visual-interactive pedagogical model for systematizing grammatical material. Its advantage lies in the fact that it is adapted for adult audiences without linguistic training; combines logical structure, color, and positive emotional context; promotes the development of independent generalization and visual thinking skills; and helps displaced persons and migrants learn the language as a tool for social integration.

The improvement observed in learners' performance aligns with international findings on the effectiveness of visual and multimodal grammar representations. According to Schoenherr, Strohmaier & Schukajlow (2024), visualization significantly enhances the acquisition of structural patterns in beginner-level language learning, particularly when color-coded cues are integrated into morphological charts. Similar results were reported by Shapiro et al. (2025), who demonstrated that interactive visual mapping reduces cognitive load and strengthens the proceduralization of linguistic rules.

The emotional-motivational impact recorded in this study also resonates with research by Farrar, Arizpe & Lees (2024), showing that visual metaphors and symbolic imagery create a more supportive learning environment for adults and increase their engagement. This suggests that the visual-interactive pedagogical model tested in this research provides not only cognitive structure but also emotional scaffolding, which is especially important for heterogeneous groups such as displaced adult learners.

Thus, the findings of this study correspond to global trends demonstrating that visual-interactive pedagogical tools simultaneously support comprehension, promote learner autonomy, and reduce affective barriers in language learning.

Approbation confirmed the pedagogical effectiveness of the Azulinho model as a means of supporting the learning process and cognitive visualization of grammar, which can be adapted for different target groups – from students of pedagogical specialties to adults who are starting to learn the language from scratch.

Prospects for further research lie in expanding the interactive component of the manual by developing a system of online exercises for all tenses and introducing adaptive modules in the Wordwall and Kahoot platforms.

Conclusions

1. An analysis of scientific approaches to the problem of visualization and interactivity in education has shown that the use of visual-interactive technologies in the pedagogical process corresponds to modern trends in the digitalization of education and the principles of a competency-based approach. The visualization of educational information is considered an effective tool for cognitive support, and interactivity is considered a means of increasing motivation, communication, and reflection among students.

2. The pedagogical functions of visual-interactive pedagogical models are to create conditions for meaningful assimilation, systematization, and generalization of knowledge. Such models perform didactic, cognitive, and emotional-motivational functions simultaneously, activate thinking, maintain learning attention, and form independent analysis skills.

3. The didactic principles underlying the author's manual *"Modos e Tempos Verbais com o Azulinho"* are based on the integration of a structural-logical presentation of grammatical material, color coding, visual diagrams, and associative cues. The manual implements the principles of gradualism, systematicity, clarity, emotional support, and feedback.

4. Color coding, schematization, and the educational character Azulinho serve as tools for cognitive and emotional support. Colors provide quick orientation in the system of verb forms, diagrams provide logical structuring of knowledge, and Azulinho creates a positive emotional background and a feeling of support, which is especially important for adult learners and beginners in language learning.

5. The pedagogical effects of implementing the model confirm its effectiveness as a means of organizing, repeating, and summarizing learning material. During testing, there was a 25% increase in the number of correct answers, a reduction in task completion time by almost half, an increase in confidence in understanding the grammatical system, and a decrease in learning anxiety.

Thus, the developed manual *"Modos e Tempos Verbais com o Azulinho"* has proven its effectiveness as a visual-interactive pedagogical model that combines cognitive logic, didactic value, and emotional-motivational support. Its use contributes to the formation of analytical, methodological, and creative competencies of future teachers, as well as ensures the effective adaptation of adult learners in the process of studying foreign languages.

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ВІЗУАЛЬНО-ІНТЕРАКТИВНА ПЕДАГОГІЧНА МОДЕЛЬ СИСТЕМАТИЗАЦІЇ ГРАМАТИЧНОГО МАТЕРІАЛУ ЯК ЗАСІБ ПІДТРИМКИ ОСВІТНЬОГО ПРОЦЕСУ МАЙБУТНІХ ВИКЛАДАЧІВ (НА ПРИКЛАДІ ПОСІБНИКА «MODOS E TEMPOS VERBAIS COM O AZULINHO»)

Постановка проблеми. Швидка цифровізація вищої освіти вимагає переосмислення традиційних підходів до підготовки викладачів, з фокусом на інтеграції візуально-інтерактивних технологій у процес навчання. Сучасна освітня парадигма наголошує на розвитку аналітичних, творчих і цифрових компетенцій, які дозволяють майбутнім педагогам перетворювати абстрактні концепції в доступні візуальні моделі. Проте практичне застосування візуально-інтерактивних засобів для систематизації граматичного матеріалу залишається недостатньо вивченим у педагогічній теорії. Усунення цієї прогалини є особливо актуальним для дорослих учнів і переміщених осіб, які вивчають іноземні мови в рамках соціальної та професійної адаптації.

Мета. Метою даної статті є обґрунтування та реалізація візуально- інтерактивної педагогічної моделі організації та систематизації граматичного матеріалу як засобу підтримки процесу навчання майбутніх викладачів, прикладом чого є авторський посібник "Modos e Tempos Verbais com o Azulinho".

Методи. У дослідженні використовувався набір теоретичних та емпіричних методів, включаючи педагогічне спостереження, контент-аналіз, експериментальне тестування та візуально-інтерактивне педагогічне моделювання. Інтерактивні платформи (Wordwall, Kahoot, Miro, Canva, Google Meet) були інтегровані в навчальний процес для перевірки когнітивних і мотиваційних ефектів розробленого посібника.

Кількісні дані були доповнені відгуками студентів і рефлексивними коментарями для оцінки зручності використання та емоційного комфорту.

Результати. Апробація посібника серед дорослих учнів продемонструвала ефективність кольорового кодування, логічного структурування та інтерактивної візуалізації для покращення граматичного розуміння. Середній показник точності збільшився з 62% до 87%, тоді як час виконання завдання зменшився на 44%. Студенти повідомили про зменшення тривоги в навчанні та покращення впевненості та мотивації. Візуально-інтерактивна педагогічна модель виявилася гнучким інструментом як для організації граматичних знань, так і для розвитку необхідних майбутнім вихователям аналітичних і творчих компетентностей.

Висновки. Розроблений посібник "Modos e Tempos Verbais com o Azulinho" підтверджує педагогічний потенціал візуально-інтерактивних технологій навчання як системоутворюючого елементу сучасної педагогічної освіти. Модель об'єднує когнітивні, комунікативні та емоційні

виміри навчання, підтримуючи перехід від відтворення знань до осмисленого розуміння. Дослідження сприяє просуванню візуально- інтерактивної педагогічної моделі в підготовці викладачів і може бути адаптовано для різних освітніх контекстів, включаючи багатомовне середовище та середовище навчання дорослих.

Ключові слова: *візуально-інтерактивна педагогічна модель; граматична систематизація; педагогічна освіта; когнітивна візуалізація; фахові компетентності; мотивація; викладання іноземної мови; освітня інновація; Azulinho.*